DRAFT Statement of Work for NNA16FRPCOMPOSITESL-ALM

Fiber Reinforced Polymer Mold Tooling and Parts Production

A. Background/History of Requirement: NASA Ames is conducting a high level research program as part of the ARMD Convergent Aeronautics Solutions program. Key to this research will be the use of thousands of identical components with high manufacturing production quality. These components have complex geometry, and must have the mechanical properties of typical fiber reinforced polymer composites. The manufacturing method that has been identified as most closely meeting the needs of the program is equivalent to commercial production injection molding with multiple non-orthogonal (not perpendicular to mold pull direction) slides/side-actions. NASA Ames Research Center may require the manufacture of tooling and subsequent production of around 10,000 components required for the associated research project, and subsequently as an experimental instrument in the in the lab for advanced manufacturing technology research, with novel material formulations.

B. Requirements Specifications:

1.0 General

1.1 The following specification is for injection molding tooling and production for a part that will be specified by CAD drawings and communications following assignment of the NASA Ames Research Center Non-Disclosure Agreement.

1.2 The expected work consists of tooling production and as a part production run of approximately 6,000 parts, along with associated setup and testing to produce small quantities of material formulations to meet performance specifications (see Section 3.0 below).

1.3 Suppliers should suggest an appropriate pricing structure that provides flexibility for the part production and materials described in Section 3.0 below. One example: itemized cost of tooling development and manufacturing, mold setup, and fully loaded machine cost per hour. Suppliers should suggest any alternative pricing strategies.

2.0 Tooling

2.1 The tooling proposed should be designed to meet or exceed SPI Mold Class 102, and must be capable of producing at least 10,000 parts.

2.2 The tooling is expected to be a two-sided mold with 2 edge gates, a modified trap runner system, 8 ejector pins (guided ejection), guide locks for alignment, and 12 mechanical slides (floats on both mold sides).

2.3 Component materials should meet or exceed the following: cavity: H13; core: H13; slide: S7.

2.4 NASA Ames Research Center will own and have the right to take possession of the tooling after 6,000 parts are produced. This right may not be exercised immediately, at the discretion of NASA Ames Research Center, in favor of follow-on contracting of further part production if you are capable and willing to do so. Please describe any advantages, drawbacks, or costs NASA should consider regarding taking possession of the tooling or not.

3.0 Part Production

3.1 Part material may include glass or carbon fiber filled polyetherimide (PEI), liquid crystal polymer (LCP), polyurethane (PU), polycarbonate (PC), and nylon. Please describe your capability to provide parts of these materials and any cost or manufacturing considerations among the materials for purchasing, tooling and setup.

3.2 If you do not have in-house resin compounding capability, it is expected that you will work together with NASA Ames Research Center and a third party compounder to test and determine a high specific modulus and strength solution (minimum performance equivalent to ~30% glass fiber filled nylon: specific gravity less than 1.5, effective elastic modulus more 100 MPa, and strength greater than 150 MPa). It is hoped that we can find a solution with lower density and higher modulus and strength than this baseline.

3.3 The part geometry is sparse with slender features, overall dimensions on the order of five centimeters, and a total volume of about one cubic centimeter.

C. Period of Performance: Please provide estimated timeframes for tooling and production efforts.